

ASD Weekly Highlights for the Week Ending 9-Nov-2005

Operations

- Hosted the successful Accelerator Readiness Review for HEBT-Ring-to Extraction Dump
- Staffed shifts for beam testing
- RF Processed warm and cold LINAC
- Ran the HEBT-Ring-RTBT Magnet testing program
- Completed procedures for PPS search and securing the RING and RTBT

Electrical Systems

No Report

SRF Facility

- DOE approved proceeding with the SRF build out on the CHL/RFTF Building. The scheduled completion date for this contract is April 30, 2006.

Survey and Alignment

S & A currently has three primary objectives:

1. Complete HEBT/Ring/RTBT alignment.
Presently we have about ten magnets remaining.
2. Support Ring Installation (On-Going)
3. Support Target/Instrument activities.

This weeks breakdown of completed activities is as follows:

- HEBT:
HEBT re-alignment: QV17, DH17, QH18, DH18, QV19, QH20, QV21, QH22, QV23, (QH24 yet to be re-aligned), QV25, DH25, QH26, QV27, QH28, QV29.
* HEBT re-alignment is complete for components yet to see beam from the truck entrance to the Ring save QH24.
Re-locate iris positions on Diagnostic group's Newport table after adjustment.
All BLMs mapped downstream of shield wall.
- RING:
Set RID wire scanner and window stands for elevation.
Re-set RID quad corrector after machining (also had to re-align the quad probably due to vacuum connections done after previous alignment).
Injection area re-alignment: DHA10 and chamber, DHA11 and chamber, DHA12 and chamber, DHA13 (chamber mapped, but not re-aligned), Idump septum.

* Chainsaw assembly mapped, but not re-aligned.
Ring re-alignment (B Arc): RA2-2, RA3-2, RA4-2, RA5-2.
All BLMs mapped

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RTBT:

All BLMs mapped up to the extraction dump.

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TARGET:

Organize data gathered to-date for BL4A and BL4B.

BL13: Measure distance from far target to BSL

BL7: Set-out PIP elevations on forms.

BL4A: Adjust precision targets for Swiss Neutronics.

BL4A: as-built elevations on bridge guide mounts.

BL4B: as-built (investigation of Z dimension discrepancy).

Shine shield octagon se-out on instrument floor for concrete fabrication work.

BL4B: Reference target set for Goniostat laser.

BL6: Shutter insert US and DS guides mapped for angular orientation and distance end-to-end.

BL13: Distance from far target to shutter face plate measured.

BL13: Chopper bolt holes set-out in stainless base plate.

Shine door survey.

BL6: Shutter insert guide scribe marks locations verified/mapped.

BL6: Shutter insert guides set to theoretical BL.

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Miscellaneous:

Tracker 677: Intermediate alignment and IFM calibrations.

Diagnostics

- **LINAC Operation:**

- a) Two BPM timing cards had to be changed due to bad connectors.
- b) Faraday Cup [DTL-160] signal cable is shorted inside the vacuum feed-through. Per AP's recommendation, we will wait for an opportune time to repair it.
- c) Wire scanner 248 and BSM NADS only needed rebooting to bring them online.
- d) Timing issues were resolved by Controls and Diagnostics engineers. Problem was traced to the duty-cycle of master clock.

- **Ring-RTBT Installation:**

- i) All BPMs are online and awaiting final calibration.
- j) 80% of BLMs are online and ready. Injection BLMs and collimator straight BLMs will be ready in two weeks. To propagate the final BLM software, we need 1-2 days of "no-beam".

- k) Ring BCM filters, amplifiers and software are ready for final calibration. We need to connect the injection BCM and bar code all beam-position toroids.
- l) Injection Video system is ready for final alignment and installation of scale-cross.
- m) Three ORNL designed wire-scanners are assembled. We hope to install six wire scanners [3 in HEBT, 1 in injection dump and two in RTBT] by Dec-16th.
- n) RTBT HARP installation schedule is tight. We successfully tested the modified bellow guides with the pneumatic motion controller.

Cryo Systems

- RF processing of the cryomodules resumed, in anticipation of beam operation next week.
- The cold cathode gauge magnet assembly was installed on cavity 4b; the vacuum readout appears good and allows an RF permit

Mechanical Systems

Shielding progress.

- All SCL waveguide chases have been fire stopped and filled with HDPE beads.
- All Ring and RTBT survey penetrations have been capped and filled with HDPE beads.

Ring Systems Installation Activities

- · The HEBT Charge Exchange Scraper vacuum preparation continued.
- · The Ring Injection Dump beamline installation was completed, leak checked and pumped down.
- · The Ring Primary Scraper cooling installation continued.
- · The Ring Collimator #2 Top Shielding installation was completed and painted.
- · The Ring Collimator #3 Top Shielding installation was started.
- · The Ring Extraction Kickers continued to be pumped down via pump carts.
- · The Ring RF straight section diagnostic chambers' (3) replacement was started.
- · The RTBT EDUMP flight tube pump down port was modified.

- · The RTBT EDUMP spool pipe was delivered.
- · The RTBT EDUMP window assembly installation was completed.
- · The RTBT Collimator #1 Shielding installation was completed and painted.
- · The RTBT Collimator #2 Shielding installation was started.

Ring Water Systems Installation

- · The HEBT magnets cooling lines were returned to operation.
- · The HEBT momentum dump cooling system was checked-out and released for operation.
- · The RID Window and Dump cooling system test and check-out continued.
- · The Ring magnets pump skid's 2nd pump was reinstalled and returned to operation
- · The Ring power supplies pump skid's 3rd pump was reinstalled and returned to operation.
- · The Ring power supplies' individual flow control valves were all cleaned and returned to operation.
- · The Ring Scraper double-wall piping installation continued.
- · The RTBT Target quads' cooling circuits were pressure tested and flushed.
- · The RTBT Target quads' buss cooling line installation continued.
- · The RTBT Collimator Cooling system installation continued.
- · The RING & RTBT pneumatic control lines' installation continued.

Accelerator Physics

HEBT, Ring, and RTBT commissioning

- Our prototype nanocrystalline diamond stripper foil has been in use for routine PSR production since Sunday Oct. 23 and it continues to perform well. It has now survived for approx. 67% as long as the longest-lived foil used at the PSR in the last year.

RF Systems

Ring RF

- All four stations are operational.

- Start-up checklists for High Power RF and Controls have been completed.
- Clean up work is still in progress on the Low-Level RF system but it is usable as it now stands.
- We operated three stations over the weekend of December 5th and 6th. We experienced cooling water flow faults on two of these stations. The fourth station was down waiting for a replacement Tuning Supply main contactor and is now operational.
- We have remote controlled oscilloscopes set up to monitor system analog readbacks.
- We have installed a web-camera to remotely monitor the status lights associated with the RF stations.

Ion Source

- The ion source on the frontend continues to deliver the required ~20 mA beam current.
- Brackets for improved LEBT position indicators have been designed and are being fabricated. The goal is to improve the LEBT position indication to an accuracy of <0.1 mm.
- A 12 pole multicusp field has been designed to confine the plasma inside the antenna. The design uses 6 permanent magnet that are water-cooled.

Controls

- The MPS and PPS systems were reviewed by the on-site ARR committee this week. No substantive pre- or post-start activities were found.
- All screens in the CCR northeast arc are now live. The table tops will be added shortly, and the laminated tops and backs (not needed for operations) will be added in January.
- The PLCs used in the Conventional Facilities portion of the Integrated Control System were reprogrammed on Wednesday afternoon. All processors, Ethernet, ControlNet, and DeviceNet modules were upgraded to the latest version of the firmware. The PLC logic was converted to version 13. The CF ControlNet network was expanded to include new subsystems. Several minor problems with communication hardware and software were uncovered and fixed. This work was performed by a dedicated 6 member team of CF, SvT, and ICS personnel.
- A test stand for checking the operation of the HEBT foils and scrapers was fabricated and tested on a momentum dump scraper actuator. The test stand will initially be used to improve the mechanical positioning accuracy of the actuator mechanism. Next week, the test stand will be used in the Ring tunnel to test the chain saw drive.
- With the exception of a few loose ends, the ring vacuum system in the injection section is complete. Checking will start next week. Only

one MPS input remains to be verified for the Ring vacuum system to complete MPS interlock checks. In addition, a single MPS input remains to be verified for the RTBT vacuum system.

- Work continued on software development for the wall ring current monitor. An additional FCM diagnostics buffer was added to the linac low-level rf systems.
- Sequences were added to support CHL 2K cold box operation. These sequences are expected to make a substantial improvement in operational reliability and economy.
- Using a real timing system in a laboratory environment, initial tests began on the LEBT/MEBT Chopper “Proto2” hardware. All were successful!! Event link and RTDL messages were correctly decoded and LEBT chopper waveforms defined by those RTDL parameters were created. Further testing and parameter definition is in progress to avoid future (not so future anymore) unwanted behavior from operator error. Next week more checking functionality will be added to the FPGA testbench to aid in regression testing.
- Integrated testing of the Ring Injection Dump (RID) and target cooling loops continued with the help of SvT. Final modifications to pump control logic (for all target cooling loops) were made (by SvT). Significant progress has been made addressing previously identified issues, which are approximately 80% complete. Changes have been required in the PLC ladder logic, EPICS databases, and operator screens. FSDs for these systems are being reviewed and updated. Changes have also been made to the top level navigation screens to facilitate access to target and RID screens.
- Testing of ring power supplies and magnets continued with the Electrical Group. Below are two example screens from these tests. The top screen shows a high-level summary of the injection region, the lower shows an error indication (water fault) detected during testing.

